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# (12) **UK Patent Application** (19) **GB** (11) **2 209 888** (13) **A**

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(66) Documents cited

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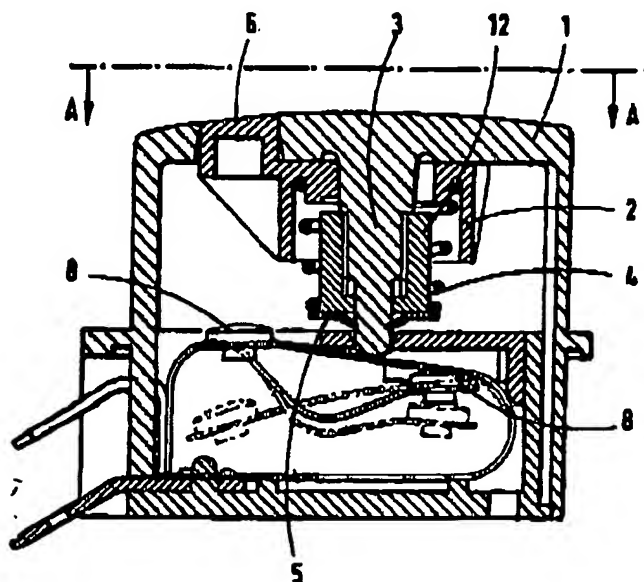
(68) Field of search

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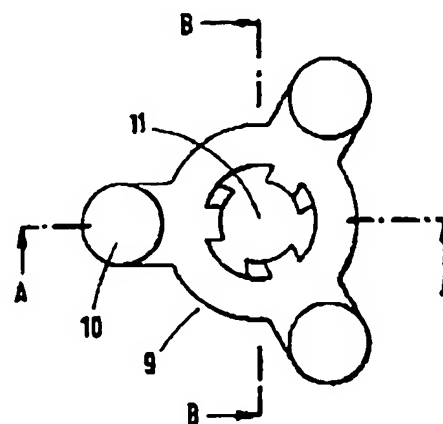
**INT CL<sup>1</sup> H01R**

(54) **An electrical socket with rotary shutter**

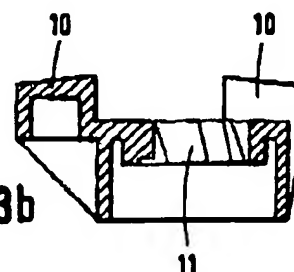
(57) The shutter mechanism for a socket comprises a rotatable shutter 2 mounted on a central member 3 fixed to housing 1. The central member 3 has at least one spiral groove along which groove(s) 11 of the shutter 2 can move during rotation. Biasing means 4 act on the shutter 2 such that when the socket is not in use the shutter 2 obscures pin holes 6 in the socket housing 1. When a plug is inserted into the pin holes 6 the shutter 2 rotates to allow the plug pins to enter the socket.



**Fig. 1**

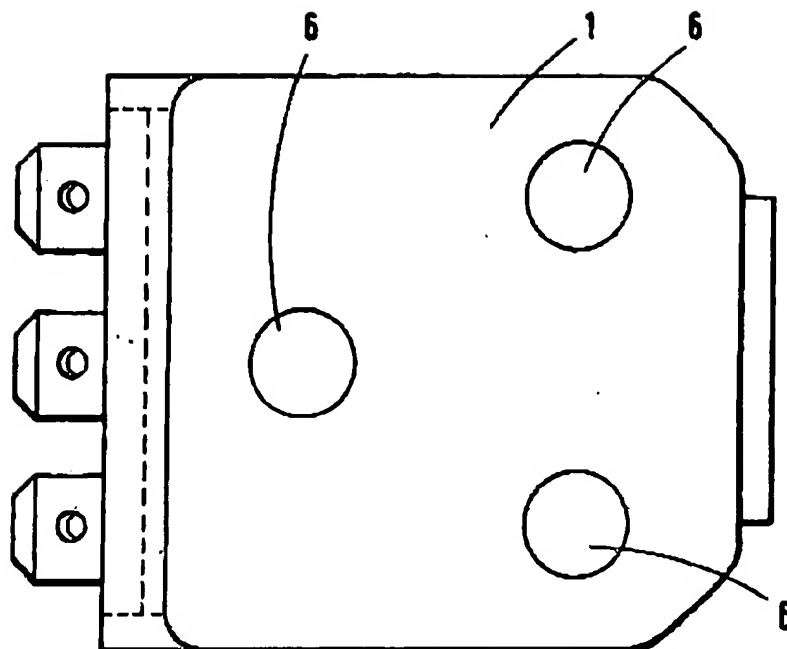
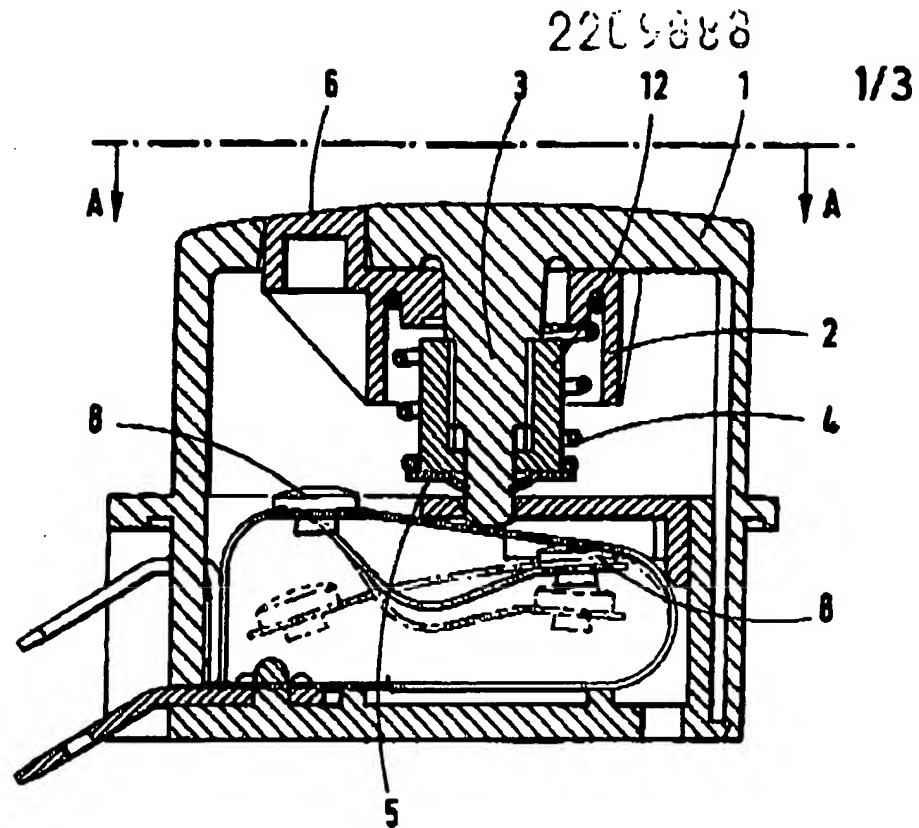


**Fig. 3a**



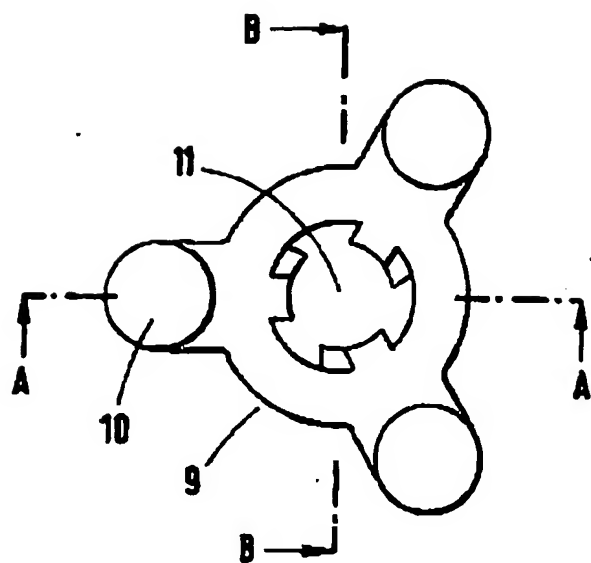
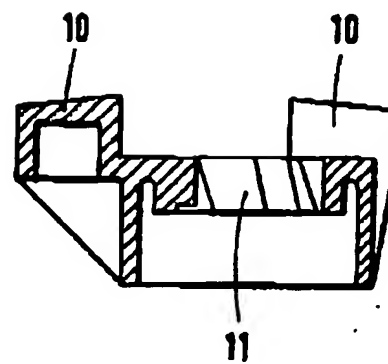
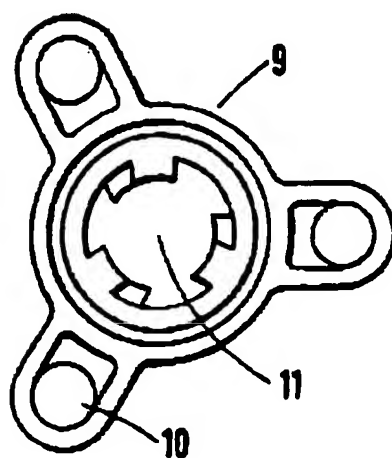
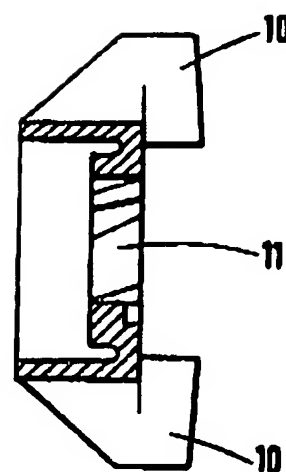
**Fig. 3b**

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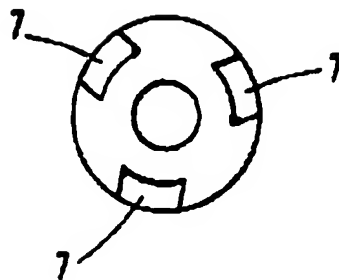
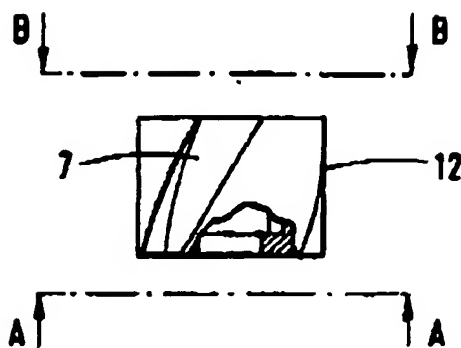
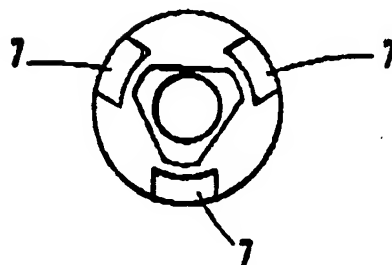
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**Fig. 3a****Fig. 3b****Fig. 3c****Fig. 3d**

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**Fig. 4a****Fig. 4b****Fig. 4c**

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An Electrical Socket

The present invention relates to an electrical socket which ensures that unless a plug is inserted correctly into the pin holes of the socket there will be no access to the socket contacts.

Until now, electrical sockets have suffered from the disadvantage that the socket allowed insertion of elongate objects other than the pins of a plug. Thus, small children could be endangered if they were to interfere with the socket. The danger is increased with the growing popularity for electrical appliances which have cordless connections to the mains supply e.g. an electric kettle which has a base stand- the plug part is fixed integrally to the kettle and the socket is housed integrally in the kettle base stand which leads to the mains supply. The most common type of socket is simply provided with sleeves for guiding the pins of a plug to socket contacts such that there is no provision for preventing the insertion of elongate objects.

Accordingly the present invention provides an electrical socket comprising a housing having holes for the pins of a plug; a shutter which is rotatably and axially moveable within the housing, the axis of movement being substantially central to the said holes; and biasing means; wherein the shutter can move between a first position in which the said holes are obscured and a second position in which the holes allow the pins of a plug to enter and wherein the biasing means biases the shutter towards the first position.

Thus, when the pins of a plug are inserted substantially

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simultaneously into the socket, the shutter rotates to said second position allowing the plug pins access to the socket. However, when an object is inserted into only one or two of said pinholes, a turning moment is applied to the shutter orthogonally to its plane of rotation and the shutter does not rotate and move along said spiral groove or grooves and remains in said first position. The present invention, therefore, ensures that there is a reduced risk of elongate objects being inserted into the socket.

A preferred embodiment of the present invention will now be described in detail, by example only, with reference to the accompanying drawings, in which:

Figure 1 shows a socket according to a preferred embodiment of the present invention.

Figure 2 is a view in the direction A-A of the socket in Figure 1.

Figures 3a, 3b, 3c and 3d show details of the shutter in Figure 1.

Figures 4a, 4b and 4c show details of part of the fixed central member with spiral grooves in Figure 1.

In Figure 1 there is shown an electrical socket with a housing 1 provided with a shutter 2. The housing 1 is also provided with a central member 3, which may either be moulded with the housing 1 or merely attached to it. The central member 3 is formed, in the case of the embodiment of Figure 1, of a splined slug 12 is pushed onto the member 3 such that it is tightly fitting and the slug 12 and member 3 do not move with respect to each other. Alternatively, the member 3 could

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be a single body. The shutter 2 is mounted on the fixed central member 3 through its substantially central hole 11.

A coiled spring 4 is then located on the central member 3 and is held in position by a retaining clip 5 which is pushed onto the end of the central member 3. The spring 4 is mounted between the shutter 2 and retaining clip 5 in such a way as to tend to resist motion of the shutter 2 caused by insertion of objects through the socket pin holes 6.

The housing 1 is provided with three pin holes 6 which are covered by the shutter 2 when the socket is not in use. When a plug is to be inserted into the socket, upon substantially simultaneous insertion of all three pins of the plug into the socket, the pressure of the three pins on the shutter 2 will act substantially along the central axis of fixed member 3, and will cause the shutter to move along spiral groove or grooves 7 in member 3 and rotate. In this embodiment the spiral grooves 7 are formed in the splined slug 12, but can also be formed directly in the body of fixed member 3.

As the shutter 2 is caused to rotate into its second position, it will no longer obscure the pin holes 6. This may be achieved in a number of ways, either as in Figure 3a where protuberances 10 on shutter 2 obscure pin holes 6 in the first position of the shutter 2 and recesses 9 are behind the pin holes 6 in the second shutter position to allow plug pins access to the socket, or it may be carried out by use of a series of holes in shutter 2.

The optimum number of spiral grooves 7 on member 3 is three, but it is possible to have more or less than this. As a

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plug is fully inserted into the socket such that its pins make contact with the spring socket contacts 8 inside the housing, the spring 4 will be fully compressed. When the plug is removed from the socket after use the spring 4 forces the shutter 2 to move back along the spiral grooves 7 and rotate back to its original first position in order to obscure the pin holes 6 again.

Figure 3a shows details of the face of the shutter 2 which rests against the housing 1, having recesses 9 and projections 10 in this embodiment, although the shutter 2 can alternatively be provided with holes in its face, or any arrangement allowing two rotationally separate positions wherein the pin holes 6 are obscured in one position and not in the other. The shutter 2 is also provided with a substantially central hole 11 which is shaped to engage the spiral grooves 7 and move up and down them. As a plug is inserted into the socket, with the projections 10 initially covering the pin holes 6, the pressure of the plug pins causes shutter 2 to rotate until the recesses 9 lie adjacent the pin holes 6 to allow the plug pins access to the interior of the socket and the spring socket contacts 8.

However, if a single elongate body or even two elongate bodies are inserted into the pin holes 6, a turning moment will be applied to the shutter 2 orthogonal to the plane in which it rotates, and the shutter 2 will not move along the spiral grooves 7 but will tend to jam in the grooves. Since the shutter 2 does not move along the grooves 7, it will not rotate and the pin holes 6 will still be obscured, preventing

access to the socket and contacts 8.

Figure 4a, 4b and 4c show details of the splined slug 12 of the present embodiment which fit onto the fixed member 3. The spiral grooves 7 are shown which engage the central hole 11 of the shutter 2.

Accordingly it can be seen that with this type of electrical socket the safety aspect is improved by ensuring that unless a plug which may be an integral part of an electrical appliance is inserted correctly into the socket the pin holes 6 will be obscured by the shutter 2. Thus any unintended access to the socket contacts 8 is prevented.

This electrical socket of the present invention could be incorporated into any household electrical circuit simply as a wall socket. Alternatively, the socket could be incorporated, as previously mentioned, into many of the electrical appliances which now make use of a cordless connection.

While in the described embodiment, the spiral grooves 7 are provided on the central member 3 with inner lugs of the shutter sliding along these grooves, it will be appreciated that the grooves could alternatively be provided on the inside of the shutter, with the central member having corresponding spiral tongues.

CLAIMS

1. An electrical socket comprising: a housing having holes for the pins of a plug; a shutter which is rotatably and axially movable within the housing, the axis of movement being substantially central to the said holes; and biasing means; wherein the shutter can move between a first position in which the said holes are obscured and a second position in which the holes allow the pins of a plug to enter and wherein the biasing means biases the shutter towards the first position.
2. An electrical socket according to claim 1 wherein the shutter moves along a member within the housing via at least one spiral groove or tongue.
3. An electrical socket according to claim 1, wherein at least one spiral groove is provided on the said member.
4. An electrical socket according to claim 2 or 3 wherein there are three spiral grooves.
5. An electrical socket according to any preceding claim wherein said shutter is provided with alternate projections and recesses around its circumference such that in said first position the projections are adjacent said pin holes and in said second position the recesses are adjacent said pin holes.
6. An electrical socket according to any preceding claim wherein said biasing means is a coil spring.
7. An electrical socket substantially as herein described and as illustrated in the accompanying drawings.